5 Gender-Based Analysis of Vulnerability to Drought among Agro-Pastoral Households in Semi-Arid Makueni District, Kenya

Chinwe Ifejika Speranza

This study analyses how gender relations shape vulnerability to drought in the semi-arid areas of Makueni District, Kenya. As an empirical study, it uses both qualitative and quantitative methods and data based on the 1999/2000 drought. The study area is a marginal environment of low agricultural potential and poverty is widespread. The interplay of environmental and socio-economic pressures on agro-pastoral households, and the compulsion to conform or to be perceived as conforming to the prevailing gendered traditional rules and norms, influences the capabilities of men and women to secure their livelihoods in non-drought periods. There is a repeated pattern whereby changes in household responses to environmental pressures come mainly at the expense of women. In times of drought, gender relations also shape the coping strategies of women and men in various ways, and the impacts of drought on household welfare challenge the traditional roles of men. Thus gender roles and relations, as well as expectations, are in flux. The study examines the different impacts of drought on women, men and children that may occur as a direct result of drought or indirectly through accompanying changes. Age also influences exposure to the impacts of drought. It is concluded that strategies to mitigate the impacts of drought need to take account of these disparities in gender relations in order to strengthen the capacities of women and men to overcome vulnerability to drought.

Introduction

Drought has different impacts on various household members and social groups. Several studies have shown that the poor, the aged, women and children, are more vulnerable to livelihood stresses and the impacts of drought (Njiro, 1999; Ernason, 2000; Bradshaw, 2004; Mishra et al., 2004; Premchander, 2004). Although such impacts are influenced by age and wealth status, this study primarily focuses on how gender influences the differentiated impacts of drought on members of agro-pastoral households.

This research is part of a broader work on modelling drought vulnerability and risk, which aims at using an integrative approach to capture the different dimensions of drought. At the outset, data were collected on households using questionnaires and targeting either the household head or the spouse. During the literature review, the author perused reports on gender and drought. However, during the fieldwork and analysis of the responses of men and women from the pilot survey, it became clear that gender is not only an analytical category but a crucial one that has to be highlighted as such, by lifting it out of the livelihood concepts within which it is implicitly embedded. Thus, the methods of data collection and analyses were expanded to incorporate gender into the analysis framework. This integration will facilitate a better understanding of women's and men's capabilities and strategies in mitigating the impacts of drought. A gender-based analysis of vulnerability to drought provides a framework for examining how societal rules, norms and identities cause unequal distribution of capabilities between men and women, and how this influences their responses to drought and their experiences of the impacts of drought. This disparity can be in terms of roles/responsibilities, division of labour, decision-making authority, power relations within households, or access to and control over household resources and benefits. The specific aim of this study is to assess how men and women respond to drought, and how gender roles and relations mediated the impacts of drought during the 1999/2000 drought.

5.1 The study area

The semi-arid area of Makueni District (Figure 1) is a marginal environment of low agricultural potential. Rain-fed agriculture and livestock keeping are the two main sources of livelihood. The rainfall pattern is bimodal with very erratic and unreliable rains of short duration that allow for only short crop-growing periods. The major crops grown are maize, cowpeas, pigeon peas and beans. In most seasons, the value and amount of the labour invested in crop farming is greater than the amount and value of the harvest (Jaetzold and Schmidt, 1983). In addition, the area is prone to drought, and in the last ten years has experienced droughts of various extent and intensity in 1997, 1998, 1999/2000, and in 2003/2004. As a result, crop failures and food shortages are common. Off-farm employment opportunities are limited in the local economies, and many, especially men, migrate to urban centres to look for employment.

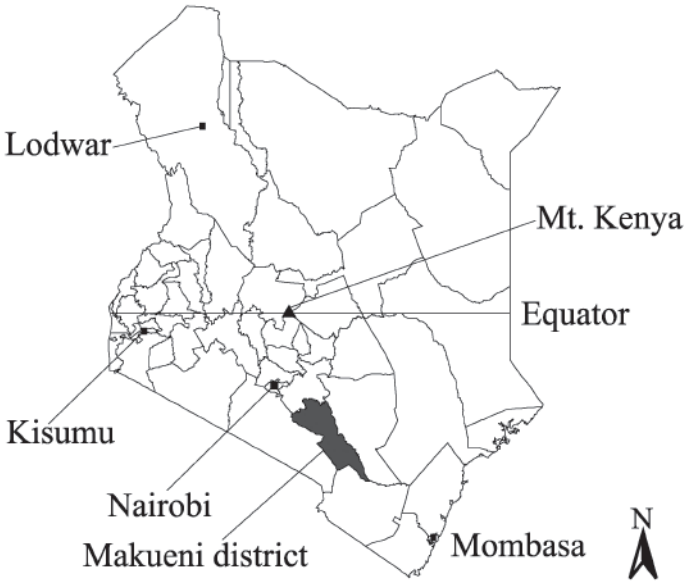

Fig. 1
The Makueni District study area in Kenya

5.2 Definitions and concepts

The four key concepts underlying this study are gender, household, action theory, and vulnerability. Gender refers to the constellation of rules, norms and identities in a specific society that prescribe and proscribe behaviour for persons, in their social roles as men and women (adapted from Kevane, 2004). In every society, access to and control over resources and social position is gendered and related to specific rules, norms and identities. Gender is socially determined and dynamic between and within societies, and as such also changes as cultural norms and values change. Gender is distinct from sex. Sex is biologically determined, while gender is socially constructed. Among other things, activity profiles, access-control profiles and gender needs assessment are part of gender analysis.

The household is the unit of analysis in this study and forms the framework within which gender roles and relations are analysed in detail. A household is a group of people who share household resources and contribute to the welfare of the household, including those household heads that live off-plot, because they regularly remit money to those living on-plot and considerably influence decision-making, use and control of household resources. A household continuously varies in its characteristics. Sometimes household members cooperate to achieve family well-being through acts of love, altruism and reciprocity. At other times, men, women and children aim to satisfy their own self-interest. They negotiate and bargain over household resources and make choices based on their preferences because of their positions within a social structure.

According to Wiesmann (1998: 37-44), action theory provides "an actor-oriented perspective for interpreting the actions and strategies of individual actors and their underlying meanings". Action theory is based on the premise that the actions and strategies of individual actors are exposed to and shaped by environmental conditions and that actors are embedded in value systems, social norms, networks and hierarchies.

Vulnerability is generally defined as exposure to livelihood risks and the incapacity of people to cope. It has both an internal aspect, comprising peoples' capacities, and an external aspect, dealing with exposure to livelihood risks (ibid). Bohle et al. (1994) define vulnerability as "an aggregate measure of human welfare that integrates environmental, social, economic and political exposure to a range of harmful perturbations". The Intergovernmental Panel on Climate Change (IPCC 2001) defines vulnerability as "a

function of the character, magnitude and frequency of climate variation to which a system is exposed, its sensitivity and adaptive capacity". According to Knutson et al. (1998) vulnerability can be measured by "the ability of the actors to anticipate, cope with, resist, and recover from drought".

Drought is an interval of time during which rainfall at a given place rather consistently fall short of the climatically expected rainfall (modified from Palmer 1965). It does not have the same impacts within a household or a society because of the different entitlements of people. Vulnerability is a key concept in analysing these different impacts and their underlying causes, as it not only focuses on limitations and lack of access to resources important for coping, but also focuses on the prospects of being able to cope in future. Thus, it is important to analyse the assets, entitlements and livelihood strategies of men and women prior to a drought in order to understand why they experience drought impacts differently and how they cope with them. An analysis of current vulnerability serves as a basis from which future impacts can be predicted and mitigated.

5.3 Methodology

This study uses a mix of quantitative (statistical analysis) and qualitative methods to analyse data collected in a longitudinal survey on agro-pastoral households, data from participation in farmer field days, interviews, and group discussions. Data were also collected through analysis of secondary literature, especially recent reports of Participatory Rural Appraisals containing activity, access, control, and seasonality profiles as well as gender needs assessment. Using the household as the unit of analysis, two surveys focusing on 127 respondents in 8 villages were carried out between January 2002 and March 2003. In the first survey, the aim was to collect baseline data on the livelihood conditions and strategies of agro-pastoral households and factors that affect them in non-drought periods. The second survey focused on the 1999/2000 drought and how agro-pastoralists perceive drought, how they coped with and recovered from its impacts and the factors that influenced their actions.

The reason for carrying out two surveys was to facilitate understanding and analysis of agro-pastoral livelihoods and strategies in non-drought times, how these change in drought times, and to facilitate comparison between the two situations. The preliminary findings were validated at the district and village levels in workshops and group discussions.

5.4 Research questions

The following questions were the entry points for analysing how gender shapes vulnerability to drought:

1. Are there differences between how women and men perceive drought and famines?
2. How does drought impact differently on women and men in the study area?
3. Do gender roles and relations positively or negatively influence vulnerability by strengthening or weakening:
   a. preparedness measures?
   b. coping and response strategies?
   c. recovery capacities and strategies?
4. What mitigation measures can be implemented to reduce the vulnerability of households to droughts, bearing in mind a gender-balanced approach?

Firstly, these questions are answered by analysing the baseline situation of men and women, gender roles and relations, division of labour, decision-making, access to and control over resources, social organisation and networks, and the household structure of the interviewed persons. Based on this background knowledge, their perception of famine and drought, as well as their experiences of and responses to drought impacts, were examined. The key gender variables that influence intra-household vulnerability to drought were then classified according to their negative or positive contributions.

5.5 Results and discussion

Gender and vulnerability prior to drought

Gender roles and relations

The rural areas of Makueni District are still predominantly governed by traditional norms and values. Rain-fed agriculture and livestock keeping are the major livelihoods. Off-farm activities are increasingly becoming crucial, especially for access to cash. In the Akamba patriarchal system, the husband is the head of the household. In the traditional subsistence farming system, the norm was that the wife contributes her labour to work on the family farms. Although these traditional norms and values have partly become obsolete with the advance of the market economy, they still influence the definition of roles for both women and men.

In the context of the prevailing patriarchy and the onset of the monetary economy, the husband is expected to provide for his family as a breadwinner, or be perceived as doing so. In the same context, the wife is the homemaker, takes care of the home and children, and is expected to support the husband to achieve household goals. However, in such a semi-arid and dynamic marginal environment, the input of both husbands and wives is needed to achieve household welfare. Hence traditional roles may seem to be maintained on the outside, but within the family women play a vital role in maintaining household welfare.

In the case of widowhood, divorce or single parenthood, women also head households. Where an elderly woman with an adult son is the household head, the adult son generally takes over headship after marriage and the birth of the first child. This change in headship also depends on intra-household power structures, as well as individual expectations and understanding of household roles.

Generally, providing shelter, security, education, clothing, and cash to meet medical expenses are the husband's responsibility, but wives also make considerable contributions to achieving these. Both provide food and work on the farms. Nursing the sick and maintaining family cohesion, especially in polygamous families, is the responsibility of women as co-wives. Both men and women perceive family needs as being shared responsibilities, but wives expect husbands to provide the cash to purchase household needs. This can be explained by the role of husbands as breadwinners and the fact that husbands have more access to cash income from off-farm activities than their wives. The foregoing reveals the dichotomies in the perception by women and men of household responsibilities and the changing views of what is expected of a man or his wife.

In order to secure their livelihoods, husbands and wives have become flexible about what they should do and their own expectations of who does what. The minimal income from sale of farm produce and the demand for cash to meet household needs forces men to take on off-farm income-generating activities in urban and rural areas. As a result, women increasingly take on men's roles. However, men are not taking on women's roles *per se*, but are also increasingly contributing their labour to roles formally regarded as female. This overlap/shift in roles is mainly under conditions of stress for the household, as in times of drought. As the situation normalises, the participation of men in women's roles generally declines.

The influence of gender roles as a limiting factor on women's mobility is different for married and unmarried women. The mobility of married women is restricted by their roles in the household, especially the care of young children and the elderly, while young unmarried women also migrate to urban areas like their male counterparts, in search of employment.

Gender-based division of labour

The primary human capital of smallholder farmers consists of labour, time and knowledge. In the study area, men engage both in on-farm and off-farm activities, while most women do household and farm work. There is a shortage of labour that is increasingly becoming a major constraint in farm work. It has led to shifts in gender-based division of labour, mainly at the expense of women.

Women carry out both reproductive and productive work. The reproductive work is not measured in monetary terms and includes childcare, care of the elderly, cooking, cleaning the house and compound, milking animals, fetching water and firewood. The productive work comprises ploughing, planting, weeding, harvesting and post-harvest tasks. Women are usually not active in produce marketing; hence they have little or no access to and control over income from produce sales. In order to access cash, women make baskets and ropes, and engage in petty trade in vegetables, women's crops, and poultry.

Men are primarily engaged in productive work that has monetary value. They work on-farm, clearing farms, terracing, ploughing, planting, grazing animals and managing pastures, and are very active in the marketing of farm produce. Where men live off-farm, they come home during the harvest as a way of taking stock of what is being harvested and to regulate its use.

Many male heads (MH) mainly work in off-farm sectors. As a result, there is always a shortage of labour during the peak farming periods in February/March (harvesting, planting and weeding), and during July/August (harvesting, digging terraces and manuring). The lack of adequate family labour unfavourably affects timely harvests and preparation of the farm for the next season. Thus, the strategies of migration and the shift of male labour to off-farm sectors create labour constraints on the farms at the expense of women and other household members, who must take on additional tasks for which MHs were formerly responsible, thereby increasing their workload. Despite the increased workload, women have little or no con-

trol over the sale of grains and the income from it. This tension was exemplified by comments of villagers during the group discussions:

> *Village man: "What is wrong is people (men) opt to look for jobs but when they hear that there is good harvest, they just come to stay idle at home".*
>
> *Village woman: "Others vanish, do not send anything home and only when there is good harvest do they re-surface".*

During the rainy season, men (those who work on-farm) work between 10-12 hours daily, on the farm as well as grazing cattle, while women work for up to 13 to 15 hours daily in the household and on the farm. Women and children spend as much as 3 hours daily fetching water for domestic use and for watering livestock. During the dry season the workload for men is reduced to 8 hours daily, while for women the hours spent working remain largely the same.

Decision making, access to and control of household resources and benefits

This section focuses on access to land, to crops for subsistence and as sources of income, to cash, and livestock ownership and utilisation.

MHs control family assets such as land, livestock, trees for timber, sand, and food, and they feel it is their responsibility to do so (Government of Kenya: GOK, 1999; author's fieldwork 2002-2003). Men own the land and its products, while women, through marriage, have access to but no rights to the land. Women do not own important assets and according to Njiro (1999: 114) "their ownership of any property is at the mercy of the men". According to traditional norms, if the MH dies, his children or male relatives inherit the household assets, while the widow cannot inherit these assets but may continue to use them. The situation is more unfavourable for childless widows, as they are totally dependent on the goodwill of their husband's relatives to continue cultivating the family land.

Both women and men can be the key decision makers in the specific farm activity they carry out. However, MHs can unilaterally decide which sections of the farm are to be used for crop production and grazing. They also decide what should be grown and how, even if they live off-farm. Those MH that live off-farm send money for the purchase of seeds or provide seeds. MHs put emphasis on income generation from crops and favour crops that have market value, while women tend to mix crops with the goal of guaranteeing food availability for household consumption. Through consultations, discussions and negotiation, a certain mix of crops is grown on the household plots.

Women have more control over poultry, fruit trees and small farm implements such as hand hoes (*Jembe*). Just as poultry is for the women, there are crops known as women's crops: sweet potatoes, pumpkins and cassava. Although these crops are drought-tolerant, they have very low market value; hence in times of drought women feed their households on them, thereby cushioning their households against hunger.

Access to cash is determined by activities in the off-farm sector, wages from casual jobs, and control of income from livestock and farm-produce sales. Because men earn mostly off-farm income, they have more access to cash. The control over income from produce sale varies from household to household and is mostly negotiated, but men mainly have the upper hand. Based on consultation between husband and wife, grain is sold for payment of school fees and for expenses. It was reported in the group discussions that in many cases, MHs and their spouses do not consult on individual needs but sell some produce to provide pocket money for their own self-interest. Selling grain without the knowledge of a spouse means there is no overview of stocks and their duration. This exposes the households to food shortages. Moreover, very few households do food budgeting.

There is no distinct association between post-harvest strategies and household characteristics. The tendency to sell produce is associated with the need for cash. Hence grains are sold to generate income to meet current needs. Food is bought when the household reserves are exhausted, provided that cash is available.

Livestock is the major household asset. MHs control the sale of large stock such as cattle, goats and sheep, while wives need not consult their husbands before selling small stock such as poultry, which fetches little income. Women milk the animals and sell milk to buy small day-to-day items needed by the household. In some households, a wife works to buy livestock and once it comes home, the husband has to be consulted before the wife can sell the livestock. Generally, the husband has the right to sell the wife's property without her permission. The property of the wife belongs to the husband but not vice-versa. In case a household member falls sick, the wife cannot take the decision alone to sell goats and cattle for medical treatment. She has to use other avenues to generate money – borrowing until the husband is consulted. After she receives the husband's permission, the usual procedure is then to contact a male relative to sell the livestock.

During group discussions, the issue of mismanagement of household funds and assets was discussed. The women mentioned that they had limited powers to influence how and when household assets are invested or divested. However, the majority agreed that decision-making and work are progressively being shared between men and women, and that women are influencing decision-making and control of family assets more than ever before.

Social networks and group organisation

Since most women are relegated to life within the homestead, their social network comprises their female neighbours and clan. Men, on the other hand, have wider networks because they are more active in crop and livestock marketing as well as in off-farm activities. Both men and women attend village gatherings (Barazas), organised by extension workers and Non-Governmental Organisations (NGO). Group organisation can be differentiated between the mandatory organisations and the optional ones. Active membership (payment of fees) in the clan groups is mandatory but not enforceable for both men and women. The main goal of such clan groups is to foster clan welfare through contributions in the form of funeral expenses, education of some members, political support, financial assistance of the elderly and the sick, as well as various clan projects.

Another example of semi-mandatory membership is the burial association, which aims to reduce funeral costs for the individual. Culturally, relatives shoulder the funeral costs of other relatives; hence it is prudent to reduce the costs of a funeral by joining funeral organisations instead of bearing the costs alone. Church organisations are not mandatory, but it is expected that church members join a church group. These church groups foster the welfare of the poorest among the poor, as members contribute food or firewood and donate them to needy families. In addition, they also offer one another assistance with farm work. Groups in which membership is optional include the Mwethya mutual help/self-help groups and the self-help savings groups (Merry-go-round; Kielo). Mwethya is a group comprising relatives, friends and neighbours called upon by an individual who needs help with a definite short-term task, while Mwilaso traditionally consists of a group of friends who work on each other's farms on a strictly rotational basis (Tiffen et al., 1994).

While 35% of the respondents were organised in mutual help/self-help groups, 50% were members of savings associations. The activities of such groups can be economical in terms of promoting income-generating activities, or in the form of mutual assistance with farm work (farming groups)

such as terracing, weeding, planting and harvesting, or in ecological activities such as soil conservation, planting of trees, trenching steep lands to conserve soil, or social welfare activities such as construction of schools, wells, feeder roads, dispensaries and health centres. There is a significant difference (Fisher's exact test, p = 0.014, 2-sided) in membership in self-help financial groups between male and female respondents. Women are more likely than men to be organised in the self-help savings groups (Merry-go-round; Kielo). This can be explained by the fact that many women do not have access to cash income due to their engagement in reproductive and productive activities that offer limited control over income from crop and livestock sales. Thus participation in financial self-help groups offers them access to cash. Women mentioned that men spend a lot of time at leisure, but men maintained that the time supposedly spent on leisure was productively spent on maintaining social networks.

Household structure and organisation

The sample comprises 127 respondents representing the households. The age of the respondents ranged from 20 to 79 years; 32% were male and 68% female. The characteristics of the respondents are displayed in Table 1. The lower number of male respondents is due to the fact that during the field visits we mainly met wives at home, as their tasks are on the homesteads, while their husbands were migrant workers or already went to work off-farm.

The household structure can be simple, consisting of the Household Head (HH), usually a man, his wife/wives and children. It can also be complex, comprising three to four generations – the MH, his aged mother, his sons, their wives

Table 1

Cross tabulation of respondent positions in the household by gender

Respondent's position in the household by gender	Respondent gender sample N (%)		Total households N (%)
	Male	Female	
Household head	37 (29)	10 (8)	47 (37)
Wife		69 (54)	69 (54)
Daughter-in-law		4 (3)	4 (3)
Son of household head	4 (3)		4 (3)
Daughter of household head		2 (2)	2 (2)
Mother to household head		2 (1)	2 (1)
Total	41 (32)	86 (68)	127 (100)

and children. The HH can also be a woman. A distinctive feature of a household is that all members share one major granary and are answerable to one HH.

Of all the household heads, 90% were male and 10% female. The 90% Male Headed Households (MHH) comprised 69%, where the MHs lived on-plot, and 21% where the MHs are active in off-farm sectors and lived off-farm. These 21% of households where the MHs lived off-farm are regarded as Female Managed Households (FMH) because the MHs continue to exercise considerable control over household assets and decision-making. Due to the limited off-farm income-earning opportunities in the rural areas, these MHs (21%) migrate either on a seasonal/temporal or permanent basis to urban centres, mainly Nairobi and Mombasa, and remit money back to the villages to support the household.

The 10% Female-Headed Households (FHH) constitute those households where the MH was dead or where the wives no longer had any ties to their husbands. If the FHH and the FMH are combined, there are 31% of the households where women are considerably involved in decision-making and carry the burdens of the day-to-day running of the households.

A differentiation of activities of household heads and their places of residence (Table 2) shows that all Female Heads (FH) live and work on-farm. However, the fact that all FHs live on-plot is not statistically significant (Chi-Square, p = 0.54, 2-sided; Fisher's exact test, p = 0.069, 2-sided). This can be explained by the small number of FHs (13/127).

Table 2

Cross tabulation of residence of household head by activity (on-farm or off-farm) and gender of household head

N=127		Main activities of household heads N (%)				
Gender of household head	Place of residence	Not active in off-farm sectors	Partly active in on-farm and off-farm sectors	Mainly active in various off-farm sectors	Mainly active in specific off-farm sectors	Total N(%)
Male	On-plot	36(31)	33(29)	1(1)	18(16)	88(77)
	Off-plot	1(1)	0 (0)	1(1)	24(21)	26(23)
	Total	37(32)	33(29)	2(2)	42(37)	114(100)
Female	On-plot	13(100)	0(0)	0(0)	0(0)	13(100)
	Total	13(100)	0(0)	0(0)	0(0)	13(100)

In 68% of the households, either the HH or the spouse was engaged in off-farm work; this applied to 17% of the spouses. This comprises those that combine work at home with farm and off-farm work (13%) and those that combine work at home with off-farm activities (4%). However, a majority of the wives (73%) were active on the farm as well as in the household. There is a relationship (Chi-Square, p = 0.007, 2-sided; Fisher's exact test, p = 0.005, 2-sided) between the gender of the houshold and the HH being solely active in the off-farm sector, and between gender and the HH combining on-farm and off-farm work (Chi-Square, p = 0.024, 2-sided; Fisher's exact test, p = 0.021, 2-sided). This means that MHs are more active in off-farm work than FHs, while FHs work in the household as well as on the farm.

Household size and dependency ratio

If only the HHs and those living permanently on-plot are considered, the average household size is 7 persons. This value slightly matches the district-wide average household size of 6 persons (GOK, 2002). However, it has to be considered that a household can consist of many generations with complex structures. The sons of a family usually migrate and remit money back home to their wives, children and parents, who live together. In some households some children visit a boarding school and only come home during the holidays. Thus considering all household members, the average household size was 10 persons, while FHH have an average of 14 members. A determining factor in household size was the age of the HH. There was a positive correlation (Spearman's rho = 0.46 at p = 0.01 level 2-tailed) between the age of the HH and household size. This particularly applies to the size of FHHs headed by elderly widows, due to their lifecycle stage.

The average demographic dependency ratio is 103 dependents for 100 working persons, whereby for 15% of the households this ratio ranges from 133:100 to 300:100. However, the ratio of dependents to income earners (including those working in subsistence agriculture) was higher, namely 142 dependents to 100 income earners, whereby for 15% of the households this ratio ranged from 200:100 to 500:100. In the context of widespread poverty, households with high dependency ratios do not have enough resources to carry them through drought periods.

Dependency ratio by household type

According to the Mann-Whitney U test, there was no significant difference (p = 0.063) in dependency ratios between male-headed households (MH) and FH. However, there was a significant difference (p = 0.033) in the earning/non-earning dependency ratios between MHs and FHs. MHs have a

higher earning/non-earning dependency ratio than the FHs. Since many FHs are elderly, the FHs consist of many working-class adults who earn income, by comparison with MHs consisting of fewer adults.

Income levels and poverty

The mean monthly household income in Kenya Shillings (Ksh) was 13,630, (USD 182, using an exchange rate of 1U$D = KSH 75). MH earned on average Ksh. 3,774.- (USD 50) while FH earned Ksh. 2,212 (USD 29) and the wives of the MH earned Ksh. 1,969 (USD 26). The male respondents earned on average Ksh. 3,793 (USD 51) per month while the female respondents earn Ksh. 2,073 (USD 28). As illustrated in Table 3, there is greater variation in income between and within households.

According to the Mann-Whitney U test, there was a significant difference ($p = 0.000$) in monthly income between male and female respondents and between MHs and their spouses (Wilcoxon signed ranks text, $p = 0.000$). Male respondents earned more than female respondents, and MHs earned more than their spouses. However, there was no significant difference (Mann-Whitney U test, $p = 0.61$) between MHHs and FHHs in household income, income per capita, or the income of household heads. The fact that the difference between MHHs and FHHs was not statistically significant can be explained by the small sample of FHHs (N = 13, 10%) compared to the MHHs (114, 90%). However, intervening factors such as age and household structure also played a role. There was a positive correlation (Spearman's rho = 0.54 at $p = 0.01$, 2-tailed) between the age of HH and household

Table 3

Income distribution between households and according to gender.

Income in Ksh		Household income	Income level (MH)	Income level (FH)	Income level (spouse (s))	Male respondent income	Female respondent income
Sample N		127	114	13	112	41	86
Mean		13'630	3774	2212	1969	3793	86
Mode		5500	2750	1250	1750	2750	1750
Minimum		0	0	250	0	0	0
Percentiles	25	5500	1750	1250	1250	1750	1250
	50	10'250	2750	1750	1750	4250	2750
	75	17'750	4250	3500	1750	4250	2750
	90	30'000	8500	4250	4250	8500	4250
Maximum		75'250	15'000	4250	15'000	12500	15000

income. As highlighted earlier, households with older heads also have many adult members who contribute to household income. Thus households headed by older women make up for the gender-based difference in income between household heads through contributions from its many adult members.

The mean income *per capita* was Ksh. 1,303 (USD 17), which was slightly higher than the poverty line estimated for rural Kenya (Ksh. 1,239~USD16.5/Adult equivalent/month in rural areas – Government of Kenya 2000). However, in 58% of the households, members lived below the rural poverty line and had to do with less than Ksh. 1,239 every month. This widespread poverty and the fact that women have lower incomes than men limits their options to prepare for stress periods like drought, and thus contributes to their vulnerability.

Education

Education is a major strategy to escape poverty, and both male and female children attend school. The level of education is generally low, and does not go beyond secondary and local polytechnic levels (Table 4).

There was neither a significant difference between the education levels of the HHs nor between male and female respondents. As the education levels of MHs rose, so did those of their spouses (Spearman's rho = 0.51 at p = 0.01, 2-tailed). This correlation has to be understood in the context of education levels that are very low in any event, and the influence of gender differentiation at such low levels is not significant.

Table 4

Level of education of household heads and respondents by gender

N=127	Male or female HH (Percent)		Male or female respondent (Percent)	
Level of education	Male	Female	Male	Female
No formal schooling	14	46	17	13
Did not complete primary school	33	38	44	30
Primary school certificate	25	8	20	34
Did not complete secondary school	3	0	2	8
Ordinary level (O Level)	16	8	15	15
Informal training	3	0	0	0
Formal training (e.g. polytechnic)	2	0	2	0
Training after O/A levels	4	0	0	0
Total	100	100	100	100

Income and education

There was a significant positive correlation between the level of education and the income of the HHs (Spearman's rho = 0.57 at p = .01, 2-tailed). As the level of education rose, so did the income. This was also the case for income from off-farm activities, as off-farm activities correlated with higher incomes (Spearman's rho = 0.56 at p = 0.01, 2-tailed). The total income of the household also increased as the number of household members working off-farm increased. As previously highlighted, since all HHs active in the off-farm sector were male, it follows that they earned higher incomes than their spouses, who were generally active on-farm and the FHs, who also were solely active on-farm. Thus, women generally have limited access to cash incomes, which constrain their capacity to cope with livelihood stresses and thus increases their vulnerability.

Occupation

The major sectors in which household members were active were trade and transport, and the informal enterprise sector comprising *jua kali* (craftsmanship) – bicycle repair, manufacture of stoves, brick-making. Other sectors are production, education, health and social services, agriculture, ranching and forestry, as well as domestic labour (watchmen and housemaids). Very few persons worked in the civil service.

For those households where the MH lives and works off-farm, the wife becomes the manager of the household, receiving and carrying out the directives of the off-farm husband. Consequently, wives take on male roles and tasks such as clearing land, ploughing and making decisions for the family (GOK, 1999 [1,2,3]; Tiffen et al., 1994; own fieldwork 2002-2003). The wives are not really the HHs, but with the absence of MHs, their influence in decision-making increases. However, major decisions such as the sale of cattle or allocation and use of farm income are largely influenced by the MHs . On the other hand, an MH is under pressure to provide for his household, and not being able to do so puts him at risk of losing his decision-making power in the household. In such a context, where maternal influence increases and male influence and role diminishes, respect for the MH and his own self-respect decline. This can lead to conflicts over expectations in individual roles and shifts in power structures within the household.

Further, the absence of their husbands puts wives in an unfavourable position. For example, their turn in using the family oxen for ploughing can be easily overridden by a male relative of the MH.

Because many MHs are engaged in off-farm sectors, the workload on their spouses increases. Wives have to manage the household, the farm and the livestock, and are constrained by the shortage of labour in maintaining or increasing production levels. Nevertheless, in times of drought, remittances from the off-farm MHs compensated for the reduced yields due to lack of rainfall.

5.6 Perceptions and impacts of the 1999/2000 drought on agro-pastoral households

In the following section, a gender-based analysis of the perception and vulnerability of the agro-pastoral households to drought is presented. The impacts of the 1999/2000 drought are used as entry points to assess the intra-household vulnerability to drought.

In semi-arid Makueni District, drought is closely intertwined with food shortages and famine. In a multiple response set, 69% of the respondents attributed drought to God's wish to punish mankind, 21% to a lack of trees due to deforestation and lack of afforestation, and 12% regarded drought as caused by changes in weather patterns and conditions.

On the other hand, famine was mainly attributed to lack of rainfall (73%). However various other factors such as poor farming methods – late planting, no weeding, choice of seed varieties (45%), mass selling of farm produce (29%), crop pests and diseases (23%) as well as small cropland sizes (14%), were also mentioned as causes of famine. Only 11% mentioned God's plan as a cause of famine.

In statistical terms, there was no significant difference between male and female respondents in their knowledge and perception of drought (Chi-Square, $p = 0.119$, 2-sided) and famines (Chi-Square, $p = 0.184$, 2-sided). The great proportion of man-made factors that foster famine reveals the current incapacity of the rural households to deal with livelihood constraints, even in the absence of drought. It also indicates that there are many options for interventions to increase the resilience of households to famine.

An important strategy for reducing drought vulnerability is the ability to access information on the likelihood of drought occurrence, be it in the form of seasonal outlooks broadcast on radio, information from extension officers, consulting diviners, or looking out for signs of drought in flora and

fauna. The assumption is that with prior information, the farmers can take appropriate action to increase their resilience to the impacts of drought. Only 29% of the households had prior information about the likely occurrence of the 1999/2000 drought, mainly from the radio. As a common practice, 36% consult sources for forecasts on the next season, while 64% do not. Of those who had foreknowledge of the likely occurrence of drought, 70% adapted their strategies in anticipation of drought times ahead, by planting drought-resistant crops and seeds, planting early maturing crops, and stopping to sell their stored grains and saving money. However, there was no significant difference between what male and female respondents do to prepare for drought. If the practice of accessing information on the likelihood of drought occurrence is taken as a proxy for drought preparedness, the foregoing shows that only 36% of the households source this information, while others respond to drought when it occurs.

Although the households classified the 1999/2000 drought as a light drought, it impaired the well-being of 85% of the households in various ways. In what follows, a summary of the major impacts of the 1999/2000 droughts on household welfare and their interplay with gender is presented.

Food shortage and food insecurity

Food shortages are usually experienced in the months of January to February and during various periods between June and December. During the 1999/2000 droughts, 91% of the households experienced food shortages, for an average of 3 months in 1999 and 5 months in 2000. In the following non-drought year of 2001, 24% still experienced food shortages of at least 3 months' duration. By 2002 the proportion of households experiencing food shortages for at least 3 months had further declined to 4%.

Due to reduced harvests and crop loss from the 1999/2000 drought, households adjusted their consumption patterns by reducing the amount of food cooked (48%), the number of daily meals (45%), and food variety (36%), such that the staple meal (Githeri), which is a mixture of maize and beans became increasingly a maize-only meal with little or no beans. Both men and women had to purchase grains at higher prices compared to the prices for which they sold the same grains previously. By the end of the drought, 64% of the households had reduced the number of their daily meals, 56% the food amounts, and 42% the food variety. Thus, the longer the households faced food shortages, the less diversified their diet became.

In what follows, the interplay between household structures, age of HHs, gender and drought impacts is explored with the aim of identifying how they foster vulnerability. Although larger households are more likely to experience longer durations of food shortages as compared to smaller ones (Spearman's rho = 0.194 at p = .05, 2-tailed), there is no significant correlation between dependency ratios and duration of food shortage. A distinction between FHHs which have elderly female heads (life cycle developments) and those that have younger female heads shows that the households headed by younger women have fewer productive members, and thus a high dependency ratio, which makes such households more vulnerable to drought impacts such as food insecurity.

In times of acute food shortage triggered by drought, some women elaborately "clean" and cook infected, contaminated or chemically preserved grains, thereby exposing themselves and their households to health hazards such as Aflatoxicosis. Knowing that the food might be poisonous, they test the effects of consumption on themselves before serving the household; thus they become the first victims of food poisoning. It was reported in the group discussions that the pressure on women to equitably distribute the little available food increased, and many reduced their own rations to the benefit of other household members. In households affected by food shortages, MHs are faced with their failure to provide for the family. Many avoid direct confrontation with their wives by spending longer hours outside the home to seek food or to be seen as doing so.

Changing gender roles and relations

As drought impacts increase and the capacity of the household to cope declines, domestic tensions rise as men are seen (and see themselves too) as failing to meet their responsibility of providing for the family. As noted in the group discussions, this may result in domestic violence and loss of authority for men. However, the major positive impact of drought on gender roles and relations is the change in the expectations of men and women about activities that are regarded as male or female.

Shifts in gender-based division of labour

The distance and time spent fetching water increased (5 km and 4 hours) considerably during drought. Under normal circumstances, it is the duty of children and women to fetch water. Because permanent water sources are few during drought and the groundwater recharge rate low, women spent longer hours at water sources queuing to fetch water. In addition, the amount of water needed in the household increased, as some households preferred to

water their livestock at home as a way of preventing the livestock from cross-infection through contact with other animals. These longer distances to fetch water and the responses to them further increased the workload of women.

Women acknowledged that men were increasingly assisting them in the household, hence in some households, both men and women equally collected water, grazed livestock, and did the planting. Due to the scarcity of water, the incidence of conflicts also increased. In crises and unsafe situations with great potential for conflict, men fetched the water, and sometimes during drought water had to be fetched in the night, as the recharge rate was faster than during the day. Thus, the drought triggered shifts in division of labour and caused changes in the expectations of men and women about their roles in household tasks.

During times of drought, both women and those MH who mainly work on farms invest a lot of time looking for alternative means of earning money through casual jobs, fetching firewood and water for sale, gathering wild fruits, and burning charcoal. As mentioned in the group discussions, women were increasingly taking over charcoal burning which was previously the domain of men, as men shifted to other more lucrative activities. Before the drought, 26% of the households produced charcoal for sale, of which 16% increased the amount of charcoal produced to compensate for missing income from crop sales during the drought. After the drought, only 5% of the households continued to produce charcoal.

Pressure on social networks and group organisation

During the drought, the financial self-help groups were forced to reduce their activities to the minimum. This was because of the impecunious circumstances of their mostly female members, as they could not afford to make their financial contributions anymore. Thus the vulnerability of the women increased, as they were not also able to meet other cash needs. After drought, as the financial situation of the women improved, activities within the groups also picked up. However, this fluctuation in activities curtails the effectiveness of such groups in the financial empowerment of the women.

Reduced income, assets and increased indebtedness

Most casual jobs available are linked to on-farm activities, hence wage labour became scarce for 22% of the respondents who were hitherto employed in on-farm wage labour. Since livestock sale is the dominant household strategy and a panacea for solving most problems, livestock prices plummeted during the drought, as many households sold their live-

stock to acquire money to buy food. Thus, the households experienced a decrease in income. In addition to livestock sales to compensate for lack of income from crops, 21% of the households sold other assets such as bicycles (6%) and land (5%), while 7% did not have anything to sell.

At the beginning of drought, 54% of the households were selling livestock to buy food. By the end of drought 33% could still do so. During the drought, 27% of the households borrowed money mainly from friends (12%), relatives (7%) and neighbours (5%) to buy food to feed the household. As an alternative, 24% of the households also borrowed food from the above-mentioned sources in addition to buying on credit from the local cereal stores. There was a significant difference in borrowing money between male and female respondents (Fisher's exact test, $p = 0.017$, 2-sided), as more female respondents borrowed money to buy food. In order to provide for household needs, and considering their already limited access to cash, women went into debt more than men by borrowing money or food to feed the household.

Government, NGOs and churches provided relief and used the number of children per household, age, widowhood, orphanage and health status, as criteria for distributing food to the affected households. 22% of the respondents participated in Food-For-Work (FFW) activities, while 47% received relief. The difference in gender participation in collecting relief was significant (Fisher's exact test, $p = 0.023$, 2-sided), while gender differentiation in participation in FFW activities was not statistically significant (Fisher's exact test, $p = 0.07$, 2 sided). It was confirmed in the group discussions that women mainly go to collect relief because they are the ones who cook. After the drought, 34% of the households continued to receive relief from the government and NGOs in addition to the school feeding programme, which was also running during the drought period.

Increase in school dropouts and reduced enrolment

As a result of reduced or no income from crop and livestock sales during the drought, some parents had difficulties paying school fees. For 17% of the households that could not pay the fees, the school authorities sent their children home from school. It has not been established whether male children drop out of school more frequently than female children, or vice versa. Rather, many children above 10 years old, including many that were attending class 4 to 8 in the primary school and those in secondary schools, dropped out and did not re-enrol after the drought. These adolescents were old enough to contribute to household welfare; hence they took on casual

jobs (Kibarua), as herds-boys and housemaids, to raise some money to help their parents. The tendency of early marriage is not common among the Akambas. For those households that could afford to pay the school fees, the School-Feeding Programme (SFP) remained a good incentive to leave the younger children in school. Without the SFP, attendance slowly drops as drought evolves (Information from Statistics office, Wote 2002).

5.7 Proposed indicators for a drought vulnerability index using a gender approach

It must be stressed that gender factors are mainly mediated by access to resources and social position, which are linked to cultural norms and values. As such they are mainly qualitative measures and are difficult to quantify. This limitation can be overcome through the use of proxy factors, which positively or negatively shape gender influence on drought vulnerability.

On the basis of data analysis and validation at field levels, indicators of the positive and negative contributions of gender to drought vulnerability are displayed in Table 5. This classification is based on the definition of Knutson et al. (1998), that vulnerability can be measured by "the ability of the actors to anticipate, cope with, resist, and recover from drought". Table 5 provides basic information on the major indicators that can be used for assessing the intra-household preparedness, response and recovery capacities and strategies. For example, the indicator "Women active in both farm and off-farm activities (paid work)" (see Table 5) would mean for a household that if a wife has paid work, she has better access to cash which increases her assets (+) and makes her better prepared (+) for stress such as in times of drought. The indicators in Table 5 constitute only part of a more comprehensive list of indicators for a drought vulnerability index. Integrating gender aspects into such an index increases the effectiveness of the index for drought vulnerability analysis and prediction.

Table 4

Level of education of household heads and respondents by gender

Indicators (*disaggregated by sex and gender)	Assets	Preparedness/ response	Recovery
Household structure and characteristics			
Households headed by women with children younger than 15 years old	(–)	(–)	(–)
Level of education above secondary and technical levels*	(+)	(+)	
Dependency ratio higher than 102:100	(–)	(–)	(–)
Poverty and access to income			
Income levels below poverty line for rural Kenya*	(–)	(–)	(–)
HH or spouse active in both farm and off-farm activities	(+)	(+)	
Women active in both farm and off-farm activities (paid work)	(+)	(+)	
Other adult household members earn income	(+)	(+)	
Division of labour			
Ownership of oxen by the household	(+)	(+)	(+)
Availability of permanent water infrastructure or source (< 3 km)	(+)	(+)	(+)
Decision-making, access to and control of resources			
Number of poultry in the household (>10)	(+)	(+)	(+)
Cultivation of women's crops	(+)	(+)	(+)
Availability of fruit trees	(+)	(+)	(+)
Woman owns land	(+)	(+)	(+)
Social network and group organisation			
Membership of women in self-help groups	(+)	(+)	
Membership of women in financial self-help groups	(+)	(+)	

5.8 Conclusion

The foregoing shows that gender is an important analytical category that determines vulnerability to drought. Gender determines access to and control over resources, as well as social position. Thus it shapes the capacities and strategies of women and men in decision-making, access to paid work, land and livestock. For men, this means that their role as breadwinners, which is already difficult to fulfil in non-drought times, becomes even more difficult. It also means that the situation of women, who are already overbur-

dened and have limited access to resources in non-drought times, is further exacerbated by drought, thus increasing their vulnerability.

The key messages (KM) can be summarised as follows:

1. Because of the migration of MHs and the increased participation of other MHs who live on-farm in off-farm activities, women are taking on more male activities than before, but this is in addition to their other roles in the household and on the farm. Hence their workload continuously increases as men migrate and divert their labour to off-farm activities.
2. On the other hand, the off-farm incomes of the men cushion the households from the impacts of drought, provided that the MH remits money on a regular basis and that drought does not affect the off-farm sector where he is active.
3. Women are still mainly active in the households and farms and as a result have limited access to cash income from off-farm activities. Thus, their financial capacity to cope with drought is limited.
4. Men control income from livestock and crop sales. Although household expenditures are negotiated, MHs have more influence on the use of farm income.
5. Women are more likely to engage in self-help financial groups, but due to their limited financial capacities, the groups become dormant during drought and have to be reactivated after most droughts. Thus their effectiveness in the empowerment of women is limited.
6. Despite the increasing responsibilities of women, men continue to make the decisions and control household assets. Women have not been able to reap the benefits of their increased labour input on the farms by increasing their access to and control over income from farm produce sales. Although women can legally own land, for poor women it is more difficult to exercise this right due to their social position.
7. Age is another important analytical category that intersects with gender to determine vulnerability to drought. Adolescents are more likely to drop out of school, due to their relatively mature age, to look for casual jobs to help their parents. Many do not return to school after drought. Also, households headed by younger women have a higher dependency ratio than those headed by older women. Thus the pressure to achieve family well-being further increases with the occurrence of drought.
8. MHs are under constant pressure to live up to their roles as breadwinners for the household, and this pressure increases with drought.

It therefore follows that the resilience of both men and women needs to be strengthened to enable them to secure their livelihoods in normal and drought times. In relation to the above-mentioned findings, the following measures are proposed:

– Mainstream gender and ensure implementation by all the relevant institutions (Government of Kenya, NGOs, community organisations and churches etc.).
– Promote the gender-sensitive low budget mechanisation of farm work to reduce the amount of time and labour spent on the farms and to increase the efficiency of production. This relates in particular to KM1 above, and will reduce the workload of women.
– Institute gender-sensitive public awareness campaigns. This will reduce the pressure to adhere to gender roles despite changing contexts; this relates to KMs 4, 6 and 8.
– Establish community banks, extend micro-credit institutes to villages and guarantee transparent and fair transaction conditions applicable to poor rural areas. This relates to KMs 5 and 8.
– Develop rural infrastructure such as water facilities. This will reduce the amount of time women and children spend fetching water and improve rural health.
– Promote complementary farm activities such as fruit farming. This may influence men to invest their labour in farming.
– Strengthen and increase women's financial capacities through promotion of complementary off-farm income-generating activities such as poultry-keeping, where women traditionally have ownership rights, as well as through stabilising and increasing the efficiency of the self-help groups already established.
– Control and stabilise the spread of HIV/AIDS. The Makueni District Development plan (2002-2008), estimates that 10-20% of the district population are infected. Although, the issue of HIV/AIDs has not been focused upon in this study, it is very important, especially with respect to male migration.
– Maintain existing free primary education and extend it to secondary and technical levels. Institutionalise apprenticeship training. Although education is costly, the households recognise its value and all capable households already implement it as a long-term strategy to reduce their vulnerability to drought.

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